

Ziaieh C Sobhani

zcs@alum.mit.edu
<http://fromthepantothefire.com/about/>

I am currently pursuing my interests in Data Visualization and User Interfaces. My blog (fromthepantothefire.com) has the most up-to-date information on what I am learning and doing, mostly targeted at the web.

RECENT PROJECTS

Cartogram of Pain Relief Access Around the World

Published December 2012

Incorporated additional data layers into ESRI shapefile using pyshp. Generated cartogram using ScapeToad and polished for publication. Published by PRI's The World: <http://www.theworld.org/cancer-new-battleground/>

Tools: QGIS, shapefiles, ScapeToad, python (pyshp, mapnik).

Hubway Data Challenge

November 2012

Winner of "Best Analysis" in data visualization challenge of first year of Boston's bike share program. Created interactive web visualization of typical weekday bike traffic in and out of each station. Demonstrating commuter and casual user trends and the importance of active re-balancing of bikes to keep the system working. Team of 4. <http://goo.gl/VHsj1>

Tools: python, JavaScript (underscore, d3, knockout), CSS, Compass/Sass, git

Also second personal submission, small multiples of station connectivity matrix throughout the day for each month of year. <http://goo.gl/Ea217>

Tools: GIMP, python (PIL)

WORK EXPERIENCE

Embedded Controls Engineer, Azure Dynamics Inc.

May 2005 – March 2012

As member of Component R&D team, wrote C for motor controllers and MATLAB Simulink code for hybrid and electric vehicle control. In charge of software quality and architecture for embedded C code and design manager for Java PC diagnostics interface.

Diagnosics Design Manager

- Design manager for motor controller diagnostics and "kernel" (simple task scheduler and low level diagnostic routines).
- Implemented custom CAN bootloader with support for Flash Programming over CAN for TI TMS320 28235 DSP and migrated diagnostics to use Unified Diagnostics Services (UDS) over CAN per ISO 14229 and network layer per ISO 15767, which eliminated need for RS232 cables in vehicles.
- Wrote drivers for CAN and SPI peripherals and performed benchmarking and unit testing to validate code changes in port from assembly to C, as part of migration from TI TMS320 2407 to 28235 DSP.
- Improved non-volatile data storage management, eliminating need for hardware and software calibration following all software upgrades, which simplified reflash steps in the field.
- Extensive diagnostics improvements including documentation of faults in support of service manuals.
- Identified and corrected legacy interrupt problem due to undocumented behavior of interrupt mask on TI TMS320 2407.
- Extensive improvements to Java PC based diagnostics interface: usability improvements and reduced threading problems.

Tools: C, Java (SWT), Eclipse, CANalyzer, CANKing, oscilloscope, multimeter. Some CodeComposer Studio.

Software Quality Lead

- Migrated build from using recursive Make to SCons for correct build dependencies and reduced maintenance.
- Introduced unit tests run on host platform and test framework which runs tests with each compile.
- Helped select bug tracking and version control tools. Perform ongoing training and support.
- Eliminated and elevated to error hundreds of compile warnings in code base.
- Refactored separate projects to share reusable code for the first time.
- Completed 6 sigma green belt project on embedded software code review process.

Tools: SCons, Fogbugz, SVN, 6 Sigma tools, gcc, TI C2400 and C2000 Compilers, Python, Make.

Hybrid and Electric Vehicle Controls

Worked with Vehicle Controls team on development, testing and commissioning for 5 different hybrid and electric vehicle

platforms. Highlights include:

- Built engine maps (torque/speed/throttle position) and torque converter maps (torque vs speed delta) based on dyno testing of OEM components.
- Detected and fixed myriad defects in areas including: improved precharge strategy for High Voltage Bus; improved battery current and power limit protections; engine crank, stall, and bog detection and response; clutch closing strategy.
- Created play-back simulation infrastructure to analyze vehicle control response using logged CAN data from vehicle and designed GUI for analyzing CAN data and model simulation data from play-back simulations.
- Design manager for Chemical Biological Protected Shelter system controls, including user interface.

Tools: MATLAB (Simulink, Stateflow, GUI toolkit), KViser Memorator, CANalyzer, CAN .dbc files, CVS. Some Perl, Visual Basic.

Consultant, Hasbro, Inc.

May 2004 – May 2005

Investigated nozzle and valve design to achieve improvement in distance performance of Super Soaker water blasters.

Tools: GNU Octave, Gnuplot, Open Office (Writer), GIMP.

Ford Motor Company Intern, Dearborn, MI

Winter 1999/2000

Analyzed vehicle weight savings with alternate material selection for hybrid Ford Prodigy.

ENGINEERING TEAMS AND COMPETITIONS

MIT Solar Electric Vehicle Team , Cambridge, MA

January 1999 – August 2001

Solar Array Designer: 6% increase over previous design. 10th place in American Solar Challenge, 2001.

Chassis Group Leader: Responsible for construction and safety of chassis. 1st place in class in World Solar Challenge, 1999.

Skills: Braze-welding, machining, suspension alignment, composite lay-ups, mold making, team work, fund-raising, VB macros for excel.

Robotics Competitions (Highlights)

Robot Race, CMU, 2004

Restored Heathkit HERO 1 using ATMEL processors. Judge's Choice prize.

MASLab Autonomous Robot Competition, MIT January 2002

Headed construction of robot and wrote C code used for navigation in unknown terrain. 1st place finish with team of 4.

Product Design Competition, MIT Fall 2001

Designed and implemented interface between First Robotics controller and actuators in conversion of Cub Cadet snow blower to remote control (series hybrid). Team of 15.

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA

Bachelor's degree in Mechanical Engineering. (GPA: 4.8/5.0)

Graduate Study in Combustion Controls.

February 2003

Sept. 2003 - May 2004

AWARDS/HONORS

6 Sigma Green Belt. Linda Gronlund Memorial Scholarship. National Merit Scholarship. Charles Wright Academy Salutatorian. Cum Laude, Nisqually All League Soccer. 9th at Odyssey of the Mind World Championships.